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GEOLOGICAL REPORT

ON

HOLDINGS OF CHROMEX NICKEL MINES

RECORD OF WORK ON CROWN GRANTED

AND LOCATED CLAIMS

CHRISTINA LAKE, B. C.

BY

ROBERT STEINER, P. GEOL.

Vancouver, B.C.

March 14, 1977

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MAPS IN POCKET

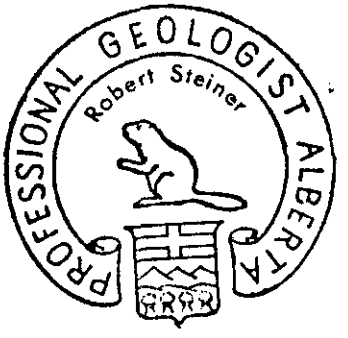
SUMMARY

Chromex Nickel Mines Ltd. owns ground covered by six reverted Crown Granted mineral claims and 205 located claims.

The claims are underlain by an ultrabasic plug, composed of dunite, gabbro and subsilicic dykes and apophyses believed to emanate from both the Nelson and Coryell intrusives. The plug appears to dip 38° easterly, is ovoid with long dimension over 15,000' and the short axis at least 6,500'. It is the host rock to nickel sulfides grading between 0.22 to 0.32% Ni. No nickel silicates of any type are present.

The enclosed maps are axiomatic.

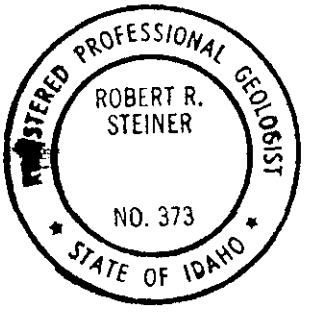
Fifty-seven AQ wireline diamond drill holes have outlined a potential of over 408,000,000 tons of nickeliferous ore.



Respectfully submitted,

Robert Steiner

Robert Steiner, P.Geol.
Alberta and Idaho



March 14, 1977

ACKNOWLEDGMENTS

R.A. Daly

H.W. Little

S. Duffell

W. Tipper

B.C. Minister of Mines Annual Reports dating from 1900 to 1960

G.I. Mathieu

R.W. Bruce

D.C. Harris

Staff of U.S. Bureau of Mines

Laboratory, Albany, Oregon, U.S.A.

The writer's daughter, age 13, who coloured the maps submitted with this report.

INTRODUCTION

The writer has been retained as a Consulting Geologist for Chromex Nickel Mines Ltd. and Hunter Point Explorations Ltd. on a continuous basis, from time to time, for the years 1966 through 1977.

During each of these years exploration work has been carried out, directed primarily to sub-surface diamond core drilling, on the six crown granted mineral claims, and adjoining located mineral claims.

MINERAL CLAIM HOLDINGS

A tabulation of mineral claims is attached to Mineral Claim Map No. 82-E-1E [M], in pocket.

GENERAL STATEMENT

The area covered by the six crown granted mineral claims and adjoining claims is located on the southwest slope of Castle Mountain, at an average elevation of 3200 fasl. Many miles of abandoned logging roads, all usable, place the property in a very favourable position with respect to exploration, development and potential open cast mining, with a minimum of ecology, tailings disposal or other environmental problems now associated with the mining industry.

LOCATION OF MINERAL CLAIMS

About three miles southeast from the resort area of Christina Lake and Cascade, B.C., alongside the 49th parallel and north and eastward. The claims are located about 110 miles north of Spokane, Washington, U.S.A.; about 350 miles east of Vancouver, B.C., via Southern Trans-Provincial Highway #3 and 14 miles east of the City of Grand Forks, B.C.

FACILITIES

High voltage transmission lines of the West Kootenay Light and Power Company and an Inland Natural Gas Co. Ltd. pipeline traverse the property in an east-west direction.

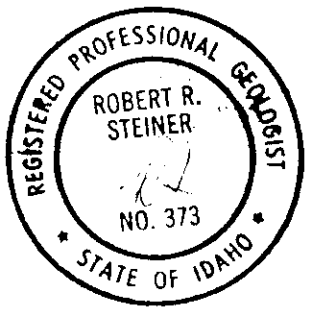
TABULATION OF MINERAL CLAIMS

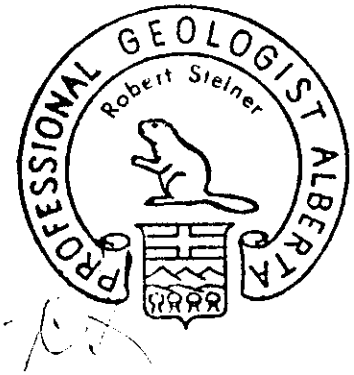
Lot No.	2384S	Mastodon	Crown	Granted	Claim
	2385S	Mammoth	"	"	"
	2386S	Dominion	"	"	"
	2387S	Pan	"	"	"
	2388S	Mastodon Fraction	"	"	"
	2390S	Canyon	"	"	"

All registered in the name of Chromex Nickel Mines Ltd., with the Registrar of Titles, Kamloops Land District at Kamloops, B.C.

Ann Nos.	1 to 100	Record Numbers	22285 to 22384
Haney			22387
Mose			22386
Charles			22385
Surprise	1 - 4		25764 to 25767
Ann	101 - 158		29444 to 29501
Tuff	1 - 4		28378 to 28381
Haz-al	1 - 4		27619 to 27622
Haz-al	9 - 16		28370 to 28377
H No.	1 - 16		29428 to 29433
Hup No.	1 - 8		28362 to 28369
Mineral Lease			M-265

All registered and recorded in the name of Hunter Point Explorations Ltd., a wholly owned subsidiary of Chromex Nickel Mines Ltd. with the office of the Mining Recorder at Grand Forks, B.C.






Maida
Copper Cr.
Christina Lake
Chandler Cr.
CASTLE MTN.
Trout Cr.
Bitter Root Cr.
Colorado Cr.
Moran Cr.
O' Farrell Cr.
Christina Cr.
Eastodon
ROSSLAND
L 1184 S
C.G.
L 1756 M 265
L 2386 S
L 2390 S
ALSO 29468-71E, 29473E
ALSO 29614E
ALSO 22328P
ALSO 22303P
ALSO 22326
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6457

Drilled out area is located within three miles of Canadian Pacific Ltd. and Burlington Northern Inc. railroads, the Southern Trans-Provincial Highway #3; within one mile of ample water supply from the Kettle River and two miles from the drainage outlet of Christina Lake. The area has a typical dry belt climate with negligible precipitation and three-month mild winters.

GEOLOGY AND MINERALIZATION

Generally the mining property is situated within a series of ultra basic and volcanic [sedimentary] rocks of the lower Cretaceous and Jurassic ages respectively. The nickel bearing ultra basics have a surface expression of some 8,000 feet, striking north from the 49th parallel, with a maximum width of 4,000 feet. They intrude the Jurassic rocks which underlie most of the mineral claims and surround the ultra basics to the west, north and northeast.

Geological studies and mapping during the past six years confirm that the principal rock types of the ultra basics are a dunite and a gabbro. They appear to be much larger bodies than previously indicated and constitute the greater part of the southern and western slopes of Castle Mountain, 4698 fasl. They are covered by the six crown granted and adjoining mineral claims.

Serpentine is present, but to no great extent. It represents the alteration of olivene, a mineral constituent of pure dunite. As such it would entail a substantial increase in overall rock volume, and accounts for the presence of sheared slickened and shattered serpentine, the largest mass occurring near the summit of the southern peak of Castle Mountain.

The dunite, gabbro and other associated rock types of the ultra basics, in diverse degrees of alteration, have been susceptible to replacement by varying amounts of mineralization, somewhat evenly distributed within the masses, carrying sulfides and oxides of nickel, iron and chromium, small amounts of copper and water soluble magnesium, [brucite].

Only a small portion of the ultra basics has to date been geologically mapped and diamond core drilled.

So little work has been done on B.C. occurrences of chromium and nickel ores that the writer must hypothesize and theorize in order to justify the claims and inferences postulated in this report. Work done by the Munition

Resources Board, during WWI; Daly's report on the geology adjacent to the 49th Parallel, 1912; and by Dr. S. Duffel, "Ashcroft Map Area, Memoir 262, G.S.C.", have helped formulate some of the opinions expressed by the writer.

PHYSIOGRAPHY

The property lies on the western flanks of the Rossland Range. This Range is separated from the Monashee Mountains, to the west, by Christina Lake. The Monashees, being high, tend to block most of the Pacific climatic influence. Thus the area may be considered a partial dry belt. However, the many east-west passes along the Border tend to permit winter climatic conditions, similar to those in the Coast Range Mountains, to exist. Therefore winters generally indicate high snowfalls, and the summers are hot and dry.

Good drainage, moderately high annual precipitation, and glacially modified terrain have resulted in substantial stands of timber. Logging is a major industry in this area. Timber covers most of the country to a height of 6,000' above sea level. Much of this timber is commercial. Thus major mining activity, such as open pit mining, would involve the disposal of valuable timber. The B.C. Forest Service has jurisdiction over all forested land, and their regulations would apply to any disposal of timber in the area covered by the claims.

The Kettle River is an international stream. Consequently, any activity involving the disposal of noxious effluents or mine wastes would be governed by the regulations of the various agencies concerned with wild life preservation and stream pollution. However, the terrain in the area is quite amenable to the storage of mine wastes, and no pollution problems are foreseen.

GENERAL GEOLOGY

The writer refers the reader to the enclosed map: "Map 6-1957, Kettle River, East Half" by H.W. Little. Direct quotations will be made from Little's notes, and these notes will be the basis for some of the postulations herein proposed.

Monashee and Grand Forks Groups:

The oldest rocks in the area are the Monashee and Grand Forks Groups. These paragneisses, crystalline limestones and pegmatites are presumed to be Precambrian. Christina Lake forms the easterly boundary of these rocks, and is

also the trace of a large, major fault. Another large fault, westerly of the lake, follows the Burrell Creek-lower Granby River valleys. Between these two faults the Monashee rocks have been highly deformed, and greatly uplifted. Later deformation and shearing, in a northerly direction, has resulted in a considerable amount of copper mineralization in the Phoenix-Deadwood areas, between Grand Forks and Greenwood. Deformation has been the result of several younger intrusives or their satellites.

Mount Roberts Formation:

Mount Roberts rocks overlie a large area to the north of the property. The greywacke, greenstone, limestone and paragneiss found in this Formation are, on the basis of fossils, of probable Pennsylvanian age. Deformation of these rocks is probably due to orogenic actions by later intrusives of Nelson, Valhalla and Coryell epochs.

Rossland Group:

The volcanic rocks of the Rossland Group overlie the Mount Roberts Group, and in the Castle Mountain area do not appear to have been extensively mineralized by copper or other metallic sulfides. However, these rocks have been intruded by Nelson, Valhalla and Coryell intrusives, and in places, such as at Rossland, do carry considerable amounts of gold, copper, silver and molybdenum.

Ultrabasic Rocks, for the basis of this report denoted as the Castle Mountain Ultrabasics:

Ultrabasic rocks underlie the claims. These bodies of dunite and possibly norite [?] have been largely serpentinized. The serpentinization may be related to activity by Nelson intrusives, immediately adjacent to the east and southeast; and the mineralization present in the ultrabasics may in part be due to the action of Coryell intrusives about .5 miles east and northerly of the property. No Valhalla rocks have been found intruding the ultrabasics in the area.

Nelson Intrusives:

Nelson intrusives form the southerly boundary of the ultrabasic rocks, and also intrude the Rossland Group. A large body intrudes the Mount Roberts Formation to the north, and also contacts the Coryell intrusives to the east. The Mount Roberts and Rossland rocks separate

the ultrabasics, surficially, except where noted above, from the Nelson and Coryell intrusives. [See map.]

Coryell Intrusives:

The youngest rocks in the immediate vicinity of the property are the Coryell intrusives. These granites, syenites, monzonites and shonkinites intrude a very large portion of the entire map area. They, and their older counterparts, the Valhalla intrusives, underlie most of the area west of Christina and Lower Arrow Lakes. In the vicinity of Castle Mountain the Valhalla rocks do not appear to have greatly influenced economic mineralizers of the Phoenix-Deadwood camps, although the greatest influence was probably effected by Nelson intrusives; and the Coryell intrusives, being the latest rocks, may have been responsible for some of the metallic mineralization present at Castle Mountain.

ECONOMIC GEOLOGY

The Castle Mountain chromite deposit is entirely within the ultrabasic rocks denoted as [5] on Map 6-1957. These rocks are noted as [18] on the adjoining and easterly map sheet, Map 1090A. Very little work has been done on the deposit. The Minister of Mines bulletin for 1918 states that some 800 tons of chromite ore, containing 30% to 40% chromic oxide were shipped to an undisclosed market. Since that time the deposit has been mentioned occasionally in other Bulletins, but no further shipments have been made.

Massive chromite has been found on the Mastodon C.G. claim, and it is probable that the ore was shipped from here. However, about 4,000' northeast of the main tunnel the ore occurs as large segregations of disseminated pebbled chromite. These deposits, on previous examination showed over 40% Cr_2O_3. The ore occurs in the usual lenticular pods, [some of which are several hundred feet long and about 50' wide] and is in the highly serpentinized dunite, which forms the ultrabasic body denoted as [5] on Map 6-1957.

It is reported by the Munitions Resources Commission, [1914-1920], that the chromite ore carried 0.012 to 0.015 ounces platinum per ton. Platinum may be present in commercial quantities, but if present at all will be in erratic concentrations scattered throughout the chromite deposit. Other chromiferous deposits, further west, e.g.: Tulameen River, display similar characteristics to those found at the Castle Mountain property. They too have been reported to carry minor quantities of platinum.

About 0.15% nickel in an undescribed form was noted by Daly in his Memoir 38, Part 1, 1913.

A small ore dump, near the main tunnel, was sampled. Spectrographic assays showed 0.8% nickel, and 38.5% chromium. The ore was fairly magnetic.

At the time the deposit was first investigated, in 1956, it was reported that nickel had been found northeast of the Mastodon tunnel. Subsequent reconnaissance disclosed the presence of nickeliferous sulfides some 15,000' northeast of the tunnel. Copper sulfides [mainly chalcopyrite] were also present. Field examination showed that the host rock was highly serpentinized dunite. This area was fairly close to outcrops of Nelson granites. The sulfides, mainly pyrrhotite, were similar to those found at the Velvet Mine some miles easterly.

This mine is also in an ultrabasic body. Although it has produced a considerable amount of gold, silver and copper, no nickel has thus far been reported. Platinum, however, has been produced in small quantities. And although the observer noted chromite in this ultrabasic rock, no one else has yet investigated the reason for its presence.

The metallogenetics at the Velvet Mine differ somewhat from those at Castle Mountain, because of a difference in orogeny. The Velvet host rock forms a huge roof pendant in and surrounded by Coryell syenite. Within the serpentine are large zenoliths of Rossland volcanics. The rocks of the pendant are cut by dykes of porphyritic syenite and pulaskite, probably related mainly to the Coryell, and possibly in part to the Nelson intrusives. Moreover, the ore shoots in the Velvet are in large shear zones in the serpentine, and these zones carry the quartz and calcite veins hosting the various metallic sulfides. At present the above features have not been found at Castle Mountain.

Although Map 6-1957 shows the Nelson intrusives contacting the Castle Mountain ultrabasics around their south and easterly boundaries, it is probable that at depth they completely surround the Castle Mountain serpentine-dunite body. Thus the observed nickel mineralization may be partly of contact metasomatic origin. Subsequent exploration determined the nickel to be present as sulfides. However, there is no surface expression of the Nelson intrusives in the southern part of the report area. The ultrabasics form a fault contact with the Rossland group of volcanic rocks.

As outlined above, several successive intrusions of plutonic rocks have taken place in the Castle Mountain area. The oldest, the Monashee and Grand Forks Groups, are of no consequence, since they themselves have been intruded by much more active, [mineralogically], plutonics. The Rossland volcanics did not contribute to any mineralization, but did, in certain other areas, act as host rocks for later depositions of metallic minerals.

The ultrabasics intruded the Rossland volcanics, but apparently made no impression on them. The dunite, through later deformation and weathering turned to serpentine. Daly, [1912], considered the rocks to be dunite. However, Little, [1960], reports that in some cases pseudomorphic outlines of pyroxene crystals indicated that some of the rocks at least were peridotites. If this is true of the Mastodon rocks, then these ultrabasics are very similar to those found on the Tulameen River, to the west of Princeton, [Camsell, 1910]. The Tulameen rocks carry appreciable quantities of chromite, and are the source of the placer platinum found in that area. They also carry nickel as sperrylite and millerite.

The Castle Mountain ultrabasics have been almost completely serpentinized, and along their contacts with intrusives have been altered to quartz-talc-carbonate rocks. This alteration is most prevalent in the northeast section of the property. Exploration disclosed the same conditions existing near the south and southeast contacts with the Nelson intrusives. The tenor of the serpentine carrying the nickel sulfides is such that the nickeliferous ore is the most resistant material in the area. The serpentine is almost talcose, and so soft and crumbly that trenching in the past needed no blasting.

The ultrabasic rocks have been intruded and surrounded by Nelson intrusives. Thus the ultrabasics appear to be, together with the Rossland volcanics, a large roof pendant. Further exploration should therefore encounter emanations such as quartz veins and pegmatite dykes, originating from the Nelson intrusives. However, the Nelson rocks appear to have reached the apex of their intrusive activities a few miles west of Greenwood. Thus their mineralizing influences may have diminished in the Castle Mountain area. They are most noted as the probable origin of the lead-silver-zinc ores of the Slocan-Ainsworth areas, north of Nelson. The Velvet Mine is one of the few westerly points, outside of the above areas at which lead and zinc occur. To the west the metallogenetic contribution

of the Nelson intrusives changed to the chrome-nickel-copper mineralization present on Castle Mountain. The Phoenix-Deadwood copper camps are probably the most westerly metallogenetic expressions of the Nelson intrusives, and here, with few exceptions only copper, gold and silver were found. Some lead and zinc deposits exist, but they are minor.

It is to be noted that the Nelson intrusives, or their westerly satellites, are more mafic at their westerly extent than in the main mass. Thus, some of the intrusives are largely quartz diorite or diorite. Evidence of these two granitoids was noted by the observer in the intrusives adjacent to the Castle Mountain ultrabasics. These more subsilicic intrusives could thus have aided in the deposition of metallics favouring a basic host. And they could have been responsible for the nickeliferous mineralization bordering the chromite deposits. Since the ultrabasics appear to be a roof pendant within these basic Nelson intrusives; it is probable that a basin favourable to the deposition of nickel underlies the Castle Mountain chromite deposit.

The youngest intrusives, the Coryell plutonic rocks, are dominantly syenitic. Being alkaline, they may also have contributed to the deposition of any metallics favouring a basic media. However, although they underlie and intrude all of the above noted rock formations, they are probably too deeply buried to have had any great metalliferous effect on the Castle Mountain area. They do outcrop only five miles easterly of the Mastodon claim. But the general contact, and therefore the zone of influence probably dips steeply west and northwest. Thus, since they do not outcrop within the Monashee rocks, and form a fault contact on the western edge of these rocks, the Coryell intrusives cannot have had any great effect on the metallic mineral deposits of Castle Mountain.

The rocks overlying the Coryell intrusives may be considered to have formed a very large roof pendant, made up of many different rock types. Notwithstanding the above, future exploration may disclose a much greater sphere of influence enacted on the Castle Mountain chromium-nickel-copper deposits by the Coryell intrusives. This proposal is valid only because of the proximity, to the east, of the Coryell intrusives to the Castle Mountain area.

DISCUSSION

Work during the past four years, from 1973 to 1976, disclosed some features of the Castle Mountain geology which altered the original opinions of the writer. The ultrabasic body, thought to be dunite, actually consisted of layers of dunite and gabbro, divided by porphyrytic dykes, or sill-like structures. These dykes consisted of syenite, plagoclase feldspars and some members of the epidote group. The dykes carried up to 0.19% nickel as millerite, or nickel in solid solution in magnetite.

With depth the ultrabasic rock became increasingly gabbroic and carried up to 0.32% nickel, in various sulfidic forms. Also with depth the ultrabasic intervals became thicker and the dykes thinner and less frequent.

Both the ultrabasic rocks and the dykes dip about 38° east. Re-examination of cores and surface geology indicate that the ultrabasic body appears to be a plug tilted 38° E. The east-west cross-section of this plug appears to be at least 6,500'. The N-S cross-section is 15,000' .

Diamond drilling indicated that with depth the chromite, so abundant on surface, decreased to a trace about 500' - 650' below the elevation of the Mastodon chromite workings. Depth, particularly east of the major fault [see maps] also changed the magnetic susceptibility of the ultrabasic rock to the point where a magnet with a 30 pound pull at 0.25" could lift about 0.5 pounds of AQ wireline core. Yet the magnetite content appears to be only 3% of the total mass.

The decrease in chromite and magnetite and the increase in nickel sulfide content, particularly millerite and minor pentlandite, with depth, also suggests magmatic segregation. Tests indicate the gabbro has a higher specific gravity than the dunite.

It is the writer's opinion that with depth the gabbro may change to a more basic rock. As a consequence, the nickel content could increase substantially. Moreover, other heavy and high temperature metals or their minerals may also occur in concert with increased nickel content of the rock.

To the northeast, near the headwaters of Trout Creek, diamond drilling tested large quartz veins cutting pulaskite dykes. Although abundant iron sulfides were present no gold, copper or nickel content of any consequence

was found. However, surface traces of both the quartz veins and pulaskite dykes were found within 4500' of DDH #51. Hand panned samples of rotten rock in this location indicated the presence of gold, copper and silver minerals.

It is therefore probable that this area is very similar to the Rossland camp. Pulaskite dykes and quartz veins invading dunite, as at the Midnight Mine, Centre Star and Le Roi caused the deposition of gold, silver, copper and nickel minerals in commercial quantity in those locations.

If the report area's eastern edge is similar to the Rossland camp, then the unexplored region northeast of DDH 21 may contain mineable quantities of gold, copper and silver together with nickel.

The writer has, in the past ten years, had ample opportunity to reconnoitre the geology adjacent to the report area. It is the writer's considered opinion that the rocks noted as Nelson intrusives may actually be various stages or phases of the Coryell intrusive. It is also apparent that the Coryell has had a superior influence in the metallogenesis of the region.

To the north, at Christina Mines, adjacent to the Paulson Pass route of Highway #3, abundant copper-zinc-lead mineralization occurs in quartz veins associated with apophyses of the Coryell Batholith. Southeasterly of Christina Mines, towards Big Sheep Creek, fluorite occurs as veins in isolated pods of Mount Roberts sedimentaries in the Coryell Batholith. And at Fife, some four miles northerly of the report area, two small bodies of hornblende-augite-gabbro occur. At their edges they are peridotitic and compare with the peridotitic dunites and gabbros near DDH 17. The two small bodies host coarsely crystalline concentrations of pyrrhotite with minor millerite, hazelwoodite, chalcopyrite and magnetite as accessory minerals. Apatite and ilmenite are also present. The general attitude of these bodies is a dip of 30° S with the long dimension of these ovoid bodies being northeasterly.

The above descriptions suggest that the ultrabasic rocks in the report area are confined to a structure slightly ovoid, tube-like and bent or curved easterly. Branches from this structure contain the ultrabasics at Fife, Christina Mines and various gold-silver-copper-nickel showings along the old "Cascade Highway", at least to Santa Rosa summit.

The structure is probably the oldest intrusive rock in the series found in the report area. It is cut by

the Nelson, Valhalla and Coryell intrusions. It is definitely related to the ultrabasics just west of Rossland. It is also related to the ultrabasic bodies near Grand Forks, Greenwood and the Pasayten-Tulameen areas. The Tulameen ultrabasics, also dunites and gabbros, are believed to be one of the surface expressions of the "Pacific Plate". The writer believes that the report area is another, more easterly expression of this Plate.

Very little data on the mineral associations, their distribution vertically and horizontally, and their hydrothermal characteristics [zoning, exsolution, grain size, etc.], is available. Only in the report area have these characteristics been examined at depth. There are no nickel silicates of any type present in the dunite or gabbro. Nickel occurring in the dykes is either in the millerite or heazlewoodite form. Some of the nickel occurs in solid solution in magnetite. Magnetite is equally dispersed in ultrabasic rocks and the intruding dykes.

Present work [1977] indicates that the nickel content is increasing with depth. Although copper, as chalcopyrite is present, only a few assays for copper have been carried out.

METALLURGICAL FLOTATION, MAGNETIC SEPARATION, LEACHING

It has been determined that the drilled-out portion of the ultrabasics carries about 5% magnetite and that about 45% of the total nickel present is in a solid solution directly associated with the magnetite. About 42% of the overall nickel content is in the form of, and associated with, sulphides and iron pyrites in the 5 to 80 micron range. Microprobe testing and examinations could not establish the form of the nickel balance.

Pentlandite is somewhat evenly distributed throughout the ultrabasics; in less altered dunite, which underlies the largest area, millerite predominates; and where more altered, heazelwoodite occurs.

Flotation tests, carried out on representative drill core rejects, in bulk and in the various Tyler mesh sizes, demonstrated that flotation is not a practical or economical method to be considered for concentration. It can be reasonably expected that advanced flotation practices can only effectively float that portion of the nickel sulphides from 50 microns up, with recovery of about 75 - 80%.

Magnetic separation testing, carried out with laboratory Jones Wet Magnetic separators, has confirmed that in the 150 mesh Tyler sizing, a minimum of 80% of the magnetite could be concentrated with commercial units.

Chemical leaching tests, using ammonia in solution, at atmospheric pressure, indicate that nickel recovery, on a large scale operation is potentially possible. However, the economics of this method have not been sufficiently investigated, with regards to optimum particle size and heap versus tank methods. Ammonia can be synthesized very cheaply from natural gas. Thus, the close proximity of the natural gas pipeline enhances the value of the deposit.

Other methods of solvent extraction, ionic exchange concentration and metal recovery methods, researched, developed and presently being used by the writer, are also applicable to the recovery of nickel from the deposit described in this report.

Recent research into the manufacture of magnesium metal, from ferro-magnesian rocks, such as the dunite present in the drilled-out area, has resulted in patents being issued on the process. The finely milled ultrabasic rocks that might present a tailings disposal problem may therefore become a valuable by-product as a source of magnesium metal.

PRESENT STATUS

DDH #57 was completed in November, 1974. The hole could not be deepened beyond 482', at -45°, because of poor drilling ground due to landslip. The strike of the hole was E.

DDH #58, at 83°E, and projected as a deep hole, is located about 200' east of DDH #17. Drilling will be under way in June, 1977.

REGISTERED PROFESSIONAL GEOLOGIST
ROBERT R. STEINER
NO. 373
STATE OF IDAHO

Respectfully submitted,

Robert Steiner

Robert Steiner, P. Geol.
Alberta and Idaho

PROFESSIONAL GEOLOGIST ALBERTA
Robert Steiner

March 14, 1977

ROBERT STEINER, B.A., PROFESSIONAL GEOLOGIST

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C E R T I F I C A T E

I, Robert R. Steiner, of 371 - 56th Street, Delta, B.C., Canada, do hereby certify that:

I am a 1950 graduate of the University of British Columbia, graduated with a B.A. degree in geology.

I am a member, in good standing, of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, registered as a Professional Geologist; and further, that I am registered as a Professional Geologist, State of Idaho, U.S.A.

I have practised as a consulting geologist since 1957.

I have no interest in the property:

CHROMEX NICKEL MINES LTD.

I do not express any guarantee or warranty. The report is based on facts resulting from personal investigations, and that opinions expressed are my own, unless otherwise so noted.

DATED at the City of Vancouver in the Province of British Columbia this 14th day of March 1977.

REGISTERED PROFESSIONAL GEOLOGIST
ROBERT R. STEINER
NO. 373
STATE OF IDAHO

PROFESSIONAL GEOLOGIST ALBERTA
Robert Steiner

Respectfully submitted,

Robert Steiner

Robert Steiner, P. Geol.
Alberta and Idaho.

This contract entered into on the 1st day of May 1976 by and between Chromex Nickel Mines Ltd of 105 West 6th Ave Vancouver and Robert R. Steiner P. Geol of 371-56th Street Delta all of the Province of British Columbia.

WHEREAS.

Chromex Nickel requires an up to date geological repprt on mineral claims owned by its subsidiary Hunter Point Explorations Ltd which are situate at and about Castle Mountain Christina Lake area, Greenwood Mining Division.

AND THE PARTIES AGREE AS FOLLOWS .

1. Logging and relogging of AXWL and AQWL diamond drill core

/ $ .20 cents per foot

2. Surveying with transit and stadia drill holes including 1976 contemplated drilling and to include roads, surface landmark features and to incorporate all data into a scaled geological surface plan map.

/ $ 450.00 per mile

3. Geological field work on property.

/ $ 400.00 per day

4. Geological reconnaissance as required bearing on property.

/ $ 350.00 per day

5. Preparation and delivery of all mapping and reports thereto including a calculation of drill indicated tonnages

/ $ 2500.00 lump sum.

Steiner undertakes to deliver to Chromex Nickel all mapping and reports before the 15th day of May 1977, and it is agreed that the dollar value of all work pursuant to this agreement is limited to $ 14,000.00

Robert R. Steiner

Robert R. Steiner.

Chromex Nickel Mines Ltd

per Michael Hretchka Director

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

PRELIMINARY SERIES

SHEET 82E (East Half)

LEGEND

CENOZOIC

TERTIARY

MIOCENE(?)

11 Basalt, olivine basalt

PALEOCENE OR EOCENE

PHOENIX VOLCANIC GROUP

10 Andesite, trachyte; minor basalt; locally, interbedded tuff, shale, and/or siltstone

9 KETTLE RIVER FORMATION: rhyolite and dacite tuff; locally, conglomerate, sandstone, and shale; minor rhyolite flows and intrusive porphyritic rhyolite

PALEOCENE(?)

8 CORYELL INTRUSIONS: syenite; monzonite, shonkinite and granite

MESOZOIC

CRETACEOUS(?)

LOWER CRETACEOUS(?)

7 VALHALLA INTRUSIONS: granite, porphyritic granite

6 NELSON INTRUSIONS: granodiorite, porphyritic granite; diorite, monzonite, quartz monzonite

5 Ultrabasic intrusions, serpentinite

JURASSIC

ROSSLAND GROUP

4 Andesite, latite; agglomerate and flow breccia; minor greywacke

PALAEOZOIC

PERMIAN(?)

ANARCHIST GROUP

3 Greenstone, greywacke, limestone; paragneiss

PENNSYLVANIAN AND/OR PERMIAN

2 MOUNT ROBERTS FORMATION: greywacke, greenstone, limestone; paragneiss

PROTEROZOIC (?)

1 MONASHEE AND GRAND FORKS GROUPS
Paragneiss; minor crystalline limestone and pegmatite

Drift-covered area
Geological boundary (defined approximate)
Bedding (inclined, overturned)
Bedding (inclined, vertical; tops unknown)
Gneissosity (inclined, vertical)
Fault (defined, approximate, assumed)
Fossil locality Ⓕ
Mineral property x11

INDEX TO MINERAL PROPERTIES

1 Waterloo (Paycheck Mining and Development Company Limited)
2 Mountain Chief (Renata Copper Company, Limited)
3 W.S. (Cascade Lode Mines, Limited)
4 Ore Denoro (Noranda Exploration Company, Limited)
5 Snowshoe and Old Ironsides (Phoenix Copper, Limited)
6 Stemwinder (Columbia Copperfield Mines, Limited)
7 Providence (W. Madden)
8 Gold Bug and D. A. (E. Ruzicka)
9 Greyhound (Salamet Mines Limited)
10 Mother Lode (Woodgreen Copper Limited)
11 Copper Queen (Aztec Exploration Limited)

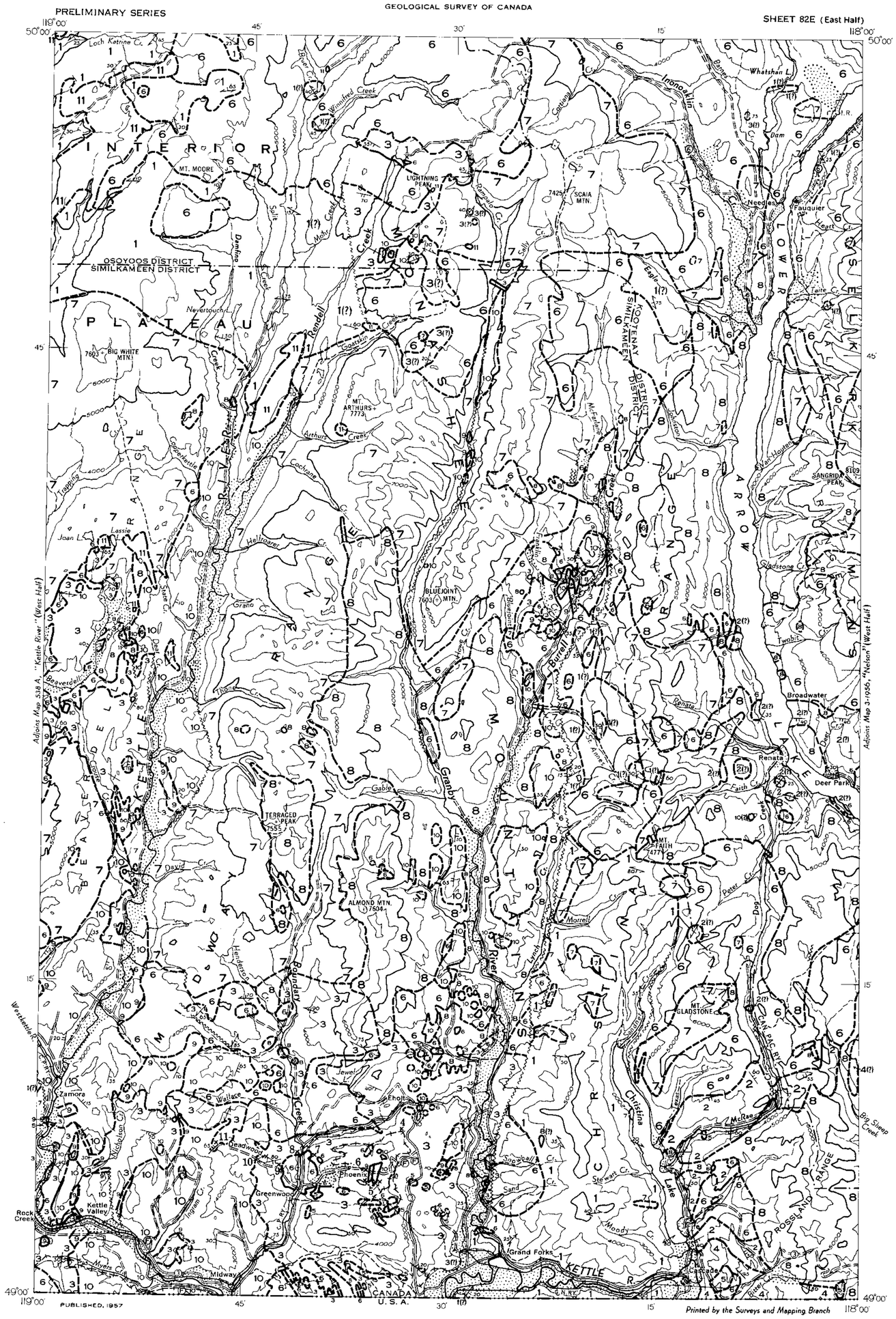
Geology by H. W. Little, 1953-1956

Cartography by the Geological Cartography Unit, 1957

Approximate magnetic declination, 22° 30′ East

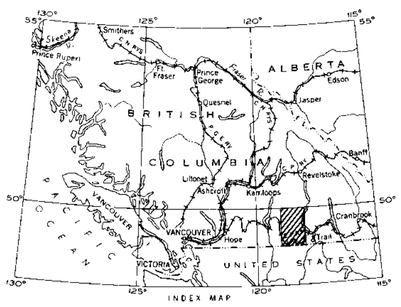
In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario



PUBLISHED, 1957

Printed by the Surveys and Mapping Branch



INDEX MAP

MAP 6-1957

KETTLE RIVER

(EAST HALF)

SIMILKAMEEN, KOOTENAY AND OSOYOOS DISTRICTS

BRITISH COLUMBIA

Scale: One Inch to Four Miles = $\frac{1}{253,440}$

Miles

4 2 0 4 8 12

LEGEND

Main highway
Other roads
Trail
Abandoned railway
International boundary
District boundary
Power transmission line
Intermittent stream
Contours (interval 1000 feet)
Height in feet above mean sea-level 7477

DESCRIPTIVE NOTES

The oldest rocks within the map-area, the Monashee and Grand Forks groups (1), occur in the northwest and south-central parts, and may include some roof pendants of gneiss in other parts. They comprise paragneisses of pre-Pennsylvanian, presumably Precambrian age. Although their relationship to the younger strata is not seen within the area, to the north they underlie Permian rocks unconformably.

Rocks of the Mount Roberts formation (2) may occur in the east-central part of the map-area as well as where shown in the southeast. Fossils, probably of Pennsylvanian age, were found in them at Paterson, to the east of the map-area, but south of the International Boundary similar rocks are classed as Permian. The Anarchist group (3), restricted mainly to the west part of the map-area, is probably, at least in part, equivalent to the Mount Roberts formation (2), and near Phoenix contains fossils believed to be Permian. A few miles south of the International Boundary, however, a collection of Triassic fossils has been reported, and beds of this age may be included with those mapped as Anarchist group (3).

Volcanic rocks of the Rossland group (4), mainly or entirely of Jurassic age, occur along the International Boundary southeast of Christina Lake, and may be intimately mixed with rocks of the Mount Roberts formation (2) in McRae Creek Valley. Rocks exposed on the ridge east of Big Sheep Creek are tentatively assigned to the Rossland group (4).

Serpentinized ultrabasic bodies (5) intrude the rocks of Late Palaeozoic to Jurassic age, and are in turn cut by granodiorite and related rocks of the Nelson intrusions (6). Non-porphyritic granodiorite is the dominant phase of the Nelson intrusions (6), but a porphyritic granite phase is common in the northeast part of the map-area and near Mount Gladstone. In those localities Valhalla granite (7) is mainly gradational into the Nelson intrusions (6), but elsewhere cuts them. Except in the western part of the area where it commonly contains large phenocrysts of microperthite, the Valhalla granite (7) is non-porphyritic. It may be distinguished from the Nelson by the presence of smoky quartz, the rarity of hornblende, and an allotriomorphic texture, in contrast to the Nelson which is usually hypidiomorphic. The age of the Nelson and Valhalla intrusions is between latest Jurassic and middle Cretaceous.

Batholiths, of reddish to pale buff Coryell syenite (8) that grades locally into granite or shonkinite, are widespread. Some of the smaller bodies of Coryell intrusions (8) are composed of augite monzonite and one is of olivine syenite. The Coryell intrusions (8) cut all the above rocks as well as a conglomerate of Upper Cretaceous or later age that occurs to the east of the map-area.

The Kettle River formation (9) consists of acidic tuff, and local basins of conglomerate and sandstone. In the conglomerate the roundstones consist for the most part of rocks of the underlying formations exposed in the vicinity. In Franklin camp a little rhyolite is interbedded with acidic tuff and sandstone. In the southwest part of the map-area small plugs of porphyritic rhyolite with quartz phenocrysts apparently mark the vents from which some of the acidic tuff was emitted.

The Phoenix volcanic group (10) overlies the Kettle River formation with apparent unconformity, for in many places it lies directly upon older formations. It consists mainly of andesitic and trachytic lavas, but locally contains interbedded sediments. A few miles east of the mouth of Burrell Creek siltstones occur in the group, and along Kettle River Valley west of Midway tuffs and shales are well exposed in road- and railway-cuts. From the latter localities fossil plants of Paleocene or Eocene age were collected.

In the northwest part of the map-area extensive flat-lying flows of basalt and olivine basalt (11), commonly with columnar structure, rest upon all older formations. These basic lavas are correlated with those of Columbia Plateau, and are probably of Miocene age.

The drift consists of fluvial clay, sand, and gravel of Pleistocene and later age, and Pleistocene till that extends to great elevations. Glacial striae were observed as high as 6,000 feet above sea-level, but some of the higher peaks appear to have escaped continental glaciation. The ice movement was in general southerly.

All formations except the Miocene (?) have been folded, the Proterozoic (?) having experienced the most intense deformation. The main north-south valleys, those of Dog and upper McRae Creeks, Sandner Creek and Christina Lake, lower Granby River and Burrell Creek, upper Granby River, and Kettle River northward from Rock Creek, contain strong shear zones that were initiated after the intrusion of the Nelson batholith. Subsequent movement on these faults has sheared rocks of the Phoenix volcanic group. The most clearly defined faults occur in the Christina Lake-Sandner Creek and lower Granby River-Burrell Creek Valleys. Between these major faults a large block of Proterozoic (?) gneiss has been uplifted relative to the younger rocks.

Mining activity reached its peak during the early part of the present century when some 22 million tons of copper ore containing gold and silver were mined in the Phoenix and Deadwood camps. This ore supplied smelters at Grand Forks, Greenwood, and Boundary Falls. Current activity is mainly centred about the old productive copper properties, but none had reached a stage of continuous production in 1956.

These copper deposits (Ore Denoro, Snowshoe, Old Ironsides, Stemwinder, Greyhound, Mother Lode, and others) are large, irregular replacement bodies containing chalcopyrite, pyrite, and magnetite in skarn formed by the metamorphism of limestone of the Anarchist group. This limestone is known locally as the Brooklyn formation. The Copper Queen copper deposit, on the other hand, consists of a vein (or veins) that occurs in an oxidized shear zone in crystalline limestone. Cupriferous sulphides have been oxidized to azurite and malachite, with limonite.

Gold and silver are the chief products of the Gold Bug property. Recent exploration has been devoted to the search for the continuation of the south vein beyond a dyke, against which it terminated. The Providence mine, which has operated intermittently since 1893, produces mainly silver and gold. The vein, which has been extensively explored, lies in altered argillaceous and volcanic rocks and in granodiorite. Ore minerals are gold, silver, proustite, tetrahedrite(?), sphalerite, and galena, with some pyrite and chalcopyrite.

The W. S. is primarily a silver-lead mine. The deposit consists of a main vein, with branch veins, that occurs in crystalline limestone of the Mount Roberts formation (2). The Mountain Chief copper deposit is in limestone within a huge roof pendant surrounded by Coryell syenite (8). Within the silicified limestone, chalcopyrite and pyrite occur, with malachite, azurite, and chalcocite (?).

The Waterloo vein is in a shear zone mainly in crystalline limestone. The vein varies in width along the strike for about 800 feet, and averages about 4 feet wide. It consists of quartz and carbonate with silver, argentite, ruby silver, stephanite, tetrahedrite, galena, and sphalerite.

MAP 6-1957
KETTLE RIVER
BRITISH COLUMBIA

SHEET 82E (East Half)

CHROMEX NICKEL MINES LTD.

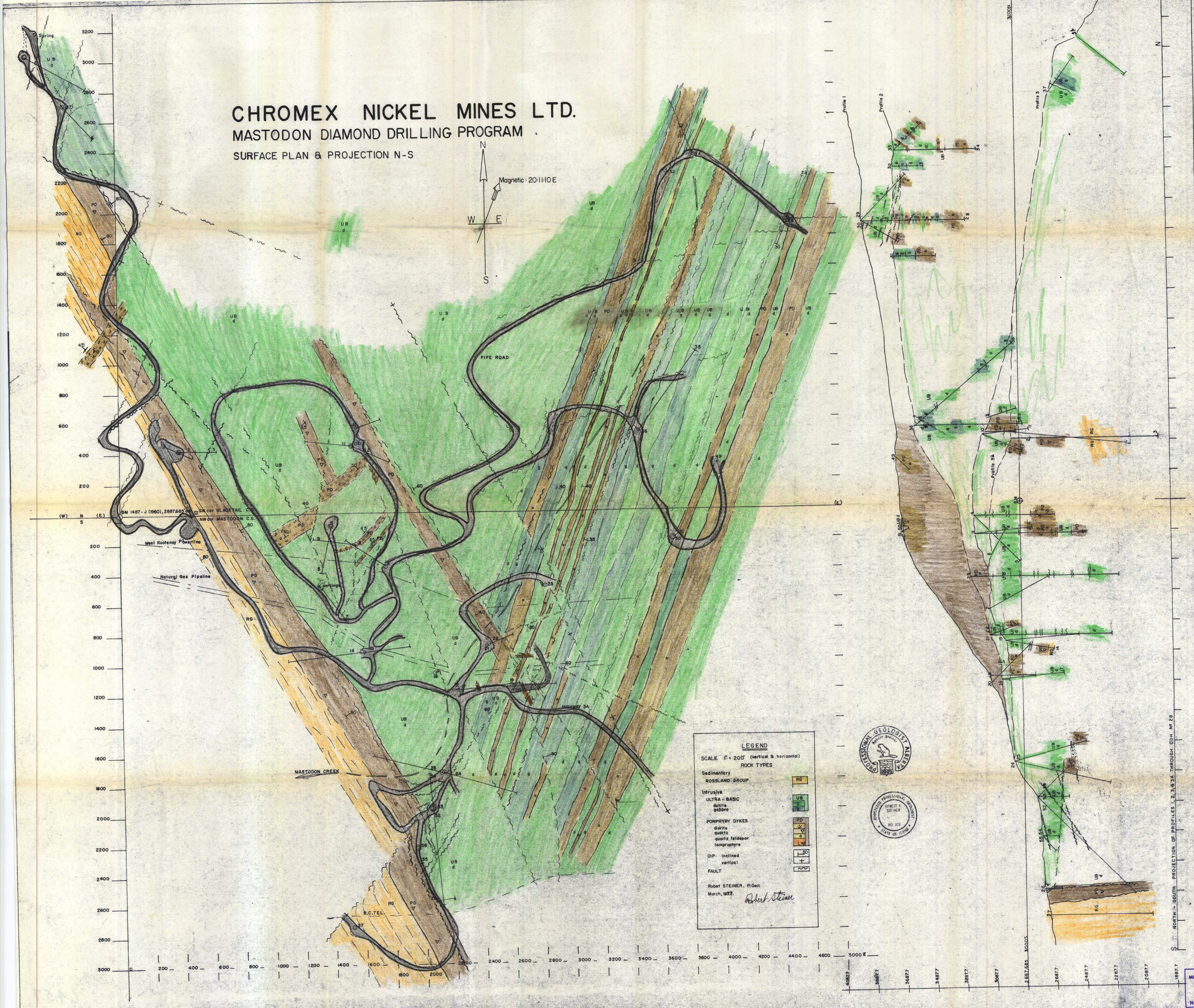
MASTODON DIAMOND DRILLING PROGRAM.

LEGEND

SCALE vertical & horizontal	1" = 500'
Porphyry Dykes	PD
Ultra-Basics	UB
West Kootenay Power	WKP
Inland Natural Gas	ING
B.C.Tel.	t
Diamond Drill Holes	(23)

Robert STEINER, P.GEOL.

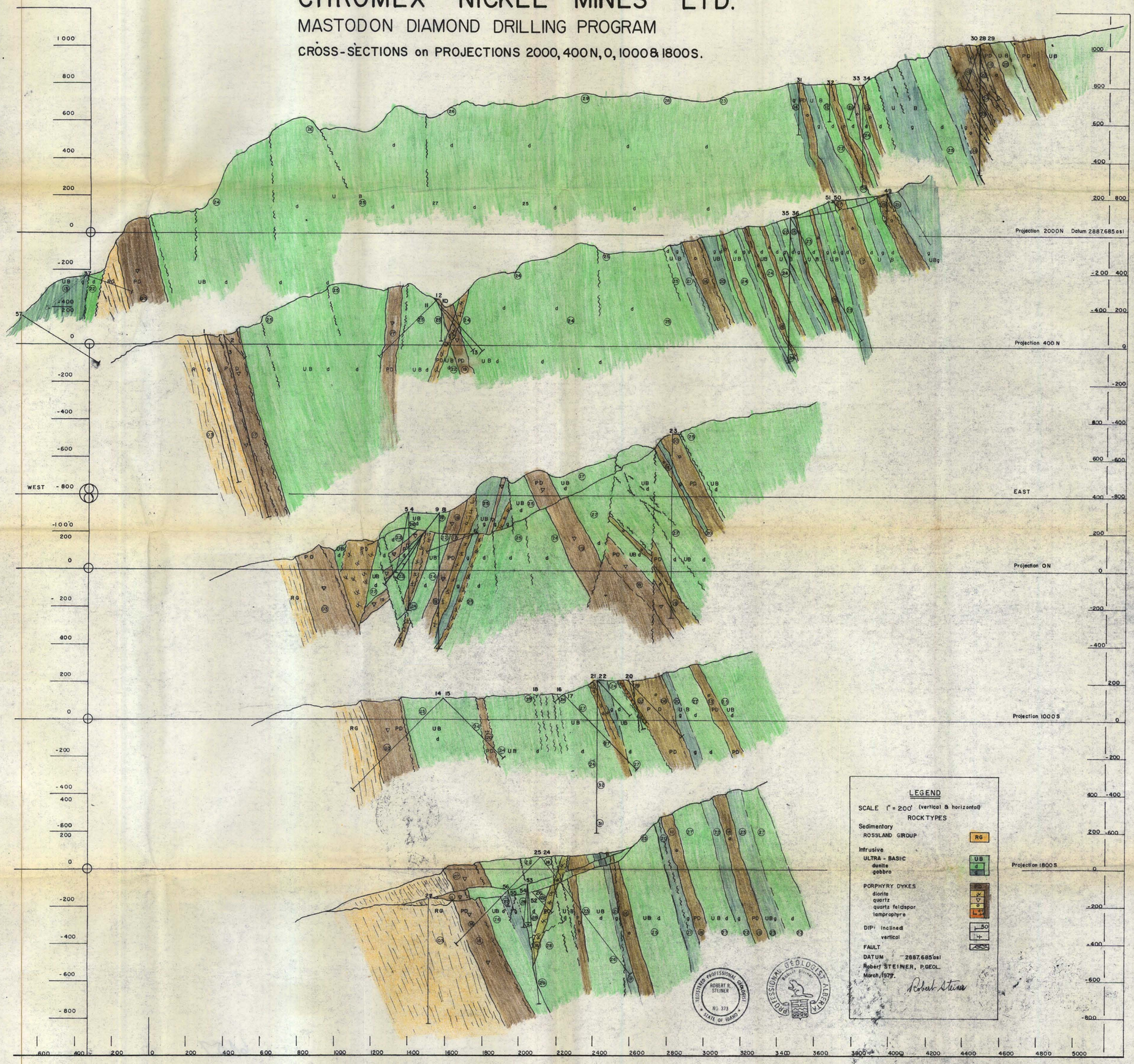
March, 1972. Robert Steiner



CHROMEX NICKEL MINES LTD.

MASTODON DIAMOND DRILLING PROGRAM

CROSS-SECTIONS on PROJECTIONS 2000, 400 N, 0, 1000 & 1800 S.



DDH	YEAR DRILLED	DIP	STRIKE	TERMINATED AT (ft)
1	'67	-75°	S66E	791'
2	'67	-45	N89E	172'
3	"	-68	N89E	1009'
4	"	-90	0	537'
5	"	-45	S16W	425'
6	"	-45	N35W	437'
7	"	-45	N55W	361'
8	'68/71	-90	0	716 (690)
9	'68	-45	N62W	395'
10	"	-90	0	198'
11	"	-45	N71W	427'
12	"	-45	S71W	374'
13	"	-45	N70E	240'
14	"	-45	S83W	691'
15	"	-45	N83E	442'
16	"	-45	S85W	67'
17	"	-45	N85E	579'
18	"	-45	N45E	20'
19	'69	-45	E	420'
20	"	-45	N15E	357'
21	"	-90	0	809'
22	"	-45	N67E	261'
23	"	-90	0	987'
24	"	-51	S73E	812'
25	"	-45	N75W	663'
26	'70	-45	N84E	153'
27	"	-90	0	670'
28	"	-90	0	690'
29	"	-45	N20E	414'
30	"	-52	S20W	300'
31	"	-90	0	273'
32	"	-90	0	201'
33	"	-45	N23W	258'
34	"	-90	0	544'
35	"	-45	N75W	921'
36	"	-90	0	774'
37	"	-42	S42E	228'
49	'71	-45	S74E	125'
50	"	-45	N52E	63'
51	"	-90	0	10'
52	"	-45	S05E	914'
53	"	-90	0	207'
54	"	-45	N25W	329'
55	"	-45	S80E	164'
56	"	-90	0	82'
57	75	-45	S30E	405'

Average NICKEL content in O.x % + (23) per section.

Compressive Strength (p.s.i.) Ore 13,320
Dykes 21,270

"MOH" Hardness Ore 4.5
Dykes 5.0

Average Specific Gravity 3.15
Lbs./cu.ft. 197
Cu.ft./ton (stu) 10.1

LEGEND

SCALE 1" = 200' (vertical & horizontal)

ROCK TYPES

Sedimentary
ROSSLAND GROUP — RG

Intrusive
ULTRA - BASIC — UB
dunite — d
gabbro — g

PORPHYRY DYKES — PD
diorite
quartz
quartz feldspar
lamprophyre

DIP: inclined — 50
vertical

FAULT

DATUM 2887.685asl

Robert STEINER, P.GEOL.
March, 1977.

Robert Steiner

REGISTERED PROFESSIONAL GEOLOGIST ROBERT R. STEINER NO. 373 STATE OF IDAHO

PROFESSIONAL GEOLOGIST Robert Steiner ALBERTA

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6457